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(54) BREAD AND INGREDIENTS FOR ITS PRODUCTION

(71) We, THE DISTILLERS COMPANY (YEAST) LIMITED, a British Company, of Crown House, Morden, Surrey, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the production of "bread" and to materials used in this. By the term "bread" we include all baked products made by baking a dough formed from a mixture comprising flour, water and yeast.

Propionic acid and its salts, in particular calcium propionate, are often included in the dough commercially in order to extend the mould-free shelf life of the bread, particularly during the summer months. Unfortunately the presence of propionic acid or its salts in dough inhibits the fermentative activity of the yeast. Additional quantities of yeast therefore have to be used if the normal proof speed is to be maintained. The need to add these additional quantities is clearly undesirable.

According to the invention we make bread by a method comprising baking a dough that contains, uniformly dispersed throughout, propionic acid or a salt thereof encapsulated in material that melts or dissolves during the baking.

The invention includes also the dough containing, uniformly dispersed throughout, propionic acid or a salt thereof encapsulated in material that will melt or dissolve during subsequent baking, and also the encapsulated propionic acid or salt thereof itself.

The encapsulating material must naturally be edible, that is to say a material that is permissible in bread. Whilst paraffin wax has been used in some of our tests the material is preferably an edible fat of the type conventionally used in baking or a similar edible fat, or some other edible material that will melt or dissolve during baking.

If the material is one that melts during baking, e.g. a fat, it must have an appropriate melting or slip point to permit this. Thus the melting point must not be too high. For example it is normally below 180°F and preferably below 150°F. However if the melting or slip point is too soft the encapsulating material will be abraded during the mixing of the dough so that although the propionic acid or salt may be encapsulated at the start of the dough production the encapsulating material may have been ruptured sufficiently before proving of the dough is complete to release sufficient of the propionic acid or salt to interfere with the activity of the yeast. In general it will be found that if the melting point is below 100°F, and often even if it is below 115°F, it will be too soft to resist the abrasion involved during the production of the dough, particularly if high speed mixers are used.

Fats that have been found to give a useful reduction in the proof time of a dough when used as the encapsulating material in the invention include paraffin wax having congealing points of 120 and 140°F, hard palm oil melting at, for example, 118 to 122°F, beef dripping melting at, for example, 115°F, Chorleywood Process bread fat melting at, for example, 100°F and commercial glyceryl monostearate, often known as GMS, melting at, for example, 135°F. GMS appears to be particularly satisfactory for use in the invention.

If the material is one that dissolves during the baking process it should dissolve (in the presence of moisture in the dough) at a temperature below the baking temperature and preferably will be hard enough to resist abrasion during mixing. Various gelatins and other natural proteinaceous colloids may be used.

It is necessary that the encapsulated propionic acid or salt should be dispersed as uniformly as possible through the dough since the less uniform the dispersion the greater is the risk of undesirable non-uniformity in the final baked product, and in particular the greater the risk of there be-

ing small charred residues in the surface of the loaf resulting from baking inadequately dispersed propionic acid (or salt) and fat. Accordingly in general it is desirable that the encapsulated particles should be as small as possible, e.g. less than 1 mm. in diameter. Preferably the encapsulated particles are in the form of a flowable powder. Whilst encapsulation can be by simple admixture of the propionic acid or salt in a melt, solution or emulsion of the encapsulating material most preferably a micro-encapsulation technique is used. For example the propionic acid or salt can be ejected in fine particles through molten fat or other liquid form of the encapsulating material in such a manner as to give the smallest practicable particle size.

The amount of propionic acid or salt used may be conventional, for example 0.05 to 0.4%. A preferred salt is calcium propionate monohydrate and this is preferably present in amounts of from 0.1 to 0.3% while propionic acid itself is preferably present in amounts of from 0.5 to 0.2% based on flour weight. The amount of encapsulating material will depend upon the amount of propionic acid or calcium or other salt thereof and upon the particle size but is generally in the range 0.5 to 3% based on the weight of flour and 2 to 10 times the weight of propionic acid or salt. Generally the amount is as low as is possible commensurate with the need to ensure that the propionic acid or salt remains encapsulated throughout the dough mixing.

EXAMPLE 1

A dough was formed from 2 lbs. 8 oz. flour, 20.25 g. salt, 25.4 g. compressed yeast, 12.1 g. improver ("Dynarex"), 650 ml. water and 0.2% by weight, based on the weight of flour, calcium propionate. This was formed by use of a high speed mixer using a work input of 5 watt-hours per pound of dough, and its proof time was measured as 53 minutes. The process was then repeated except that the calcium propionate was first dispersed in warm water into which was then blended 3.5 times its weight (0.7% by weight based on the weight of flour) of molten GMS and the resultant mixture was cooled and when solid was broken into small fragments and then mixed into the dough. The proof time was 51 minutes.

EXAMPLE 2

The process of Example 1 was repeated using, in place of the calcium propionate, 0.11% non-encapsulated propionic acid. The proof time was 56 minutes. This process was then repeated except that the propionic acid was first encapsulated in about 6 times its weight of GMS powder (0.7% by weight based on the weight of flour) by the same method as in Example 1. The proof time was 49 minutes.

Thus in each Example there was a valuable drop in proof time as a result of encapsulating the propionic acid or salt.

WHAT WE CLAIM IS:—

1. A method of making bread comprising baking a dough that contains, uniformly dispersed throughout, propionic acid or a salt thereof encapsulated in material that melts or dissolves during the baking.

2. A method according to claim 1 in which the encapsulating material is an edible fat.

3. A method according to claim 2 in which the fat has a melting point of 100 to 180°F.

4. A method according to claim 3 in which the fat has a melting point of from 115 to 150°F.

5. A method according to claim 4 in which the fat is commercial glyceryl monostearate.

6. A method according to any preceding claim in which the encapsulated particles are in the form of a flowable powder.

7. A method according to any preceding claim in which the dough contains 0.1 to 0.3% calcium propionate monohydrate based on flour weight.

8. A method according to any of claims 1 to 6 in which the dough contains from 0.05 to 0.2% propionic acid based on flour weight.

9. A method according to claim 1 substantially as herein described with reference to either Example.

10. Bread made by a method according to any preceding claim.

11. A composition comprising propionic acid or a salt thereof encapsulated in edible fat melting at a temperature in the range 100 to 180°F.

12. A composition according to claim 11 in which the fat melts at a temperature in the range 115 to 150°F.

13. A composition according to claim 12 in which the fat is commercial glyceryl monostearate.

14. A composition according to any of claims 11 to 13 in the form of a flowable power consisting of the encapsulated propionic acid or salt.

15. A composition according to any of claims 10 to 13 in the form of a bread dough having the encapsulated propionic acid or salt uniformly dispersed throughout.

16. A composition according to claim 11 substantially as herein described with reference to either Example.

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